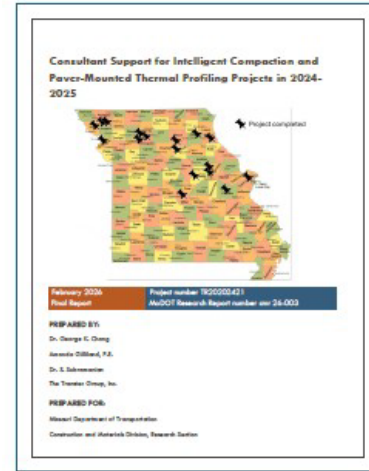


Research Summary

Project Consultant Support for IC and PMTP Projects in 2024- 2025

The Missouri Department of Transportation (MoDOT) began implementing Intelligent Construction (IC) and Paver-Mounted Thermal Profiling (PMTP) technologies in 2017 as part of a long-term strategy to improve pavement quality assurance (QA) and deliver more durable, cost-effective roadways. Over eight years, the program evolved from pilot projects into a structured system supported by formal protocols, specifications, standardized tools, and training. A key milestone was developing data validation procedures to meet 23 CFR 637 Subpart B – Quality Assurance Procedures for Construction. These procedures ensure compliance with federal standards while promoting accountability and consistency across projects.

In 2024-2025, support efforts focused on enabling PMTP implementation and maintaining IC readiness through training, tool development, and remote assistance. Annual statewide online workshops were held for contractors and MoDOT staff, with updated materials, FAQs, and hands-on examples posted to SharePoint for on-demand access. Macro-enabled Excel tools for project summaries and QA analysis were updated to comply with Microsoft security guidelines and incorporate revised PMTP validation thresholds based on field data. Remote support via Microsoft Teams was instrumental in troubleshooting data collection and analysis



issues, while fielding questions from both contractors and MoDOT personnel. Knowledge transfer was facilitated through an external SharePoint site that served as a centralized hub for forms, guides, and training content. Annual reports and feedback meetings summarized seasonal results, highlighted common issues, and provided a forum for discussion.

“A key achievement under this project was the establishment of a more robust PMTP validation process using FLIR verification data.”

The adoption of the new 406 specification, which introduced higher price incentives and disincentives compared to the previous special provision, produced the best PMTP results to date. These improvements demonstrate that the revised incentive structure may motivate contractors to improve their paving practices, thereby reducing thermal segregation.

A key achievement under this project was the establishment of a more robust PMTP validation process using FLIR verification data. Updates to QA tools developed and refined the “Pseudo” Range Statistic (PRS), which is similar in concept to the Differential Range Statistic (DRS) used in AASHTO R 110-22 but applied to a smaller footprint captured by the FLIR image



rather than the 150-foot sublots used in PMTP analysis. This refinement ensures that validation criteria remain practical for field conditions while still detecting equipment errors and meeting federal requirements. While validation was successful in most cases, common issues such as invalid FLIR images and unclear event markers persisted.

Dispute resolution procedures were drafted, including steps to verify that the verification data is valid and that the verification device is functioning properly before requiring the contractor to send the PMTP equipment to the manufacturer for calibration and troubleshooting.

IC use was limited in 2024-2025. Adoption has slowed in recent years, largely due to the high cost of verification equipment required for CFR-compliant validation. To address this challenge, MoDOT plans to pilot a new IC specification in 2026 that removes costly validation requirements and instead focuses on timely data submission for informational purposes, removing the need for verification. In addition, IC will be piloted on subgrade materials to assess its feasibility for characterizing stiffness and correlating with Dynamic Cone Penetrometer (DCP) testing, potentially expanding its role as a practical QA tool in future specifications.

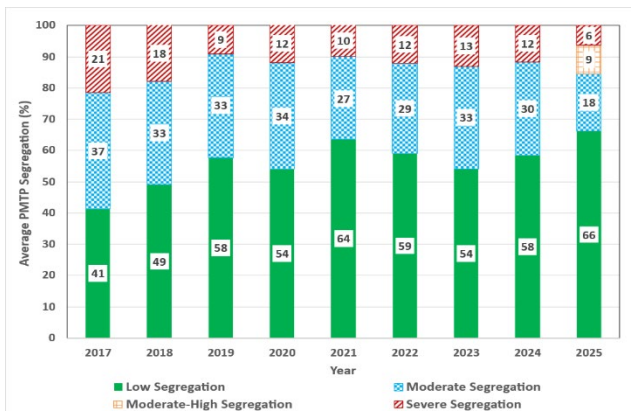


Figure 1: Average PMTP thermal segregation classification for all projects per construction season.

Project Information

PROJECT NAME: TR202421—Consultant Support for IC and PMTP Projects in 2024-2025

PROJECT START/END DATE: January 2024-February 2026

PROJECT COST: \$256,192.42

LEAD CONTRACTOR: The Transtec Group, Inc.

PRINCIPAL INVESTIGATOR: Dr. George K. Chang

REPORT NAME: Consultant Support for IC and PMTP Projects in 2024-2025

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